# Global Differential GPS on NASA's DC-8 AirSAR Flights

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## ABSTRACT

Differential GPS (DGPS) positioning is performed in real-time during NASA's DC-8 AirSAR flights. Preliminary results show dual-frequency real-time RMS (root-mean-square) precision in the horizontal components to be better than 6 cms RMS, and better than 8 cms RMS in the vertical. Additionally, the absolute accuracy of these position measurements is better than 25 cms in all components.

GPS orbits and clocks are computed in real-time with data from NASA's global GPS network. The dissemination of the global correction message is over the Internet, and a signal-in-space (SIS) is provided by America's Inmarsat satellite. The SIS also has expanded for global coverage with Inmarsat's ASPAC (Asia/Pacific) and EMEA (Europe/Africa) satellites yielding coverage over the entire globe between +/-75 degrees in latitude. The inherent latency in providing the corrections to the user through the geosynchronous satellites is shown to have little impact on true real-time positioning.

GPS data is obtained from an Ashtech Z-12 receiver, and the global corrections are obtained from an LBM Inmarsat receiver that was provided by NavCom. The measurements and global corrections are combined on a linux laptop in real-time. Additionally, the external pressure is read from the DC-8's Icats flight data system, and is used to model the dry-zenith troposphere delay.

## REFERENCES

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